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VOL. IX FEBRUARY No. 2

EDITORIAL

WHAT CAN WE DO, OR WHAT WE CAN DO

By Former Editor H. H. Williams

The first expression may be that referring to a bewildered mind or one under some unusual condition, while the second indicates a positive effort. Persons or groups without ambition or interest in affairs of their own or those they represent, are little troubled over either condition.

People that do things are the ones who through the desire to help themselves or society, are sometimes brought to serious thought upon matters before them.

The bewildered state is usually due to some difficult proposition or condition confronting them, and unless they are prepared for these emergencies, a mistake is likely.

The positive attitude of "What we can do" is usually that of experience or knowledge of how to deal with situations and conditions, even some that may be unfamiliar.

In our work in and for the A. E. S., many questions along educational lines and welfare of our Society come before us.

Those of a technical and practical nature arouse keen interest and attention in the meetings of the Branches and at Conventions. Our progressive members, anxious to advance, prepare themselves through these papers and discussions to improve existing conditions, and also to be ready for emergencies.

All of our members should take advantage of these opportunities presented, giving and taking in knowledge, helping and being helped, preparing and being prepared for unusual or new conditions.

Our motto signifies going forward: it reads: "A Society for the ADVANCEMENT of the science of Electro-plating." The Society advances as individual members force it. A few may develop new lines, but the advancement is made by the many. So this is "What we can do": Progress.

Considering the welfare of our Society we must maintain the present high standard of membership. We have the respect and coöperation of our employers and they wish us well. This is largely due to the class

of our membership. We are not men, simply with a knowledge of our chosen profession, but have been selected on account of special fitness to the responsibility of a supervising capacity. The importance of this position is being recognized more today than ever, by employer, and also by magazines and books on "Industrial Management."

Recently our attention has been called to the fact that our Constitution should be revised. This is no reflection on the present one, except that amendments have been adopted faster than new Constitutions have been printed.

However, we have progressed under it, the Society was started along the proper lines, the fundamentals are sound and with slight changes, to meet new conditions, we can go on. We cannot hope that even with a perfectly revised Constitution, to have one that will be entirely satisfactory very long, unless it is made more difficult to amend or unless our members get it out of their system that an important part of each Convention is to have a number of amendments to submit. It is natural that there will be differences of opinion upon the amendments presented. It does not follow that when an amendment is presented, that it must be adopted. It may have been submitted after careful consideration by some member and approved by his Branch, there may be good reasons under certain conditions in its favor, yet there may be better reasons that it be defeated.

Delegates to past Conventions have done well even "if some errors of omission and commission have slipped through." Upon the results of our present attainments " We can" strengthen the foundation and build thereon the permanent structure of coöperation and friendship of our members and progress in the knowledge of our art.

Every Branch should be represented at each Convention by at least one of their own members. May this come true at Cincinnati.

EDITOR'S NOTE

We regret that we are unable to give some of our correspondents the usual amount of space. We are unable to find space for our Chicago report or their Question-Box. The "Question-Box" will appear in the March issue. We also will publish the Cincinnati report at that time, but don't forget CINCINNATI IN 1922! A little of the St. Louis material is also on hand, which will help to make the March number more than usually interesting.

THE EDITOR.

COMPOSITIONS

A. Oldtimer. St. Louis Branch.

Compositions are a varied lot, almost as many as the colors of the rainbow. They are made for many purposes, and for many kinds of material, each kind having its various uses in the preparing or finishing of metals.

Crocus Composition was the first to be used in the art, and for a long time was the only one known. It was used for cutting down, and coloring of the soft metals preparatory to plating, and the finer grades used for coloring after plating.

Today Crocus is not used very largely. It is still in use for the purpose of cutting down soft metal on sheep-skin buffs as in the casket hardware trade; also for coloring copper, and a few still use it for putting a high color on iron and steel before plating.

Very fine Crocus, or rather rouge, is still used in both powder and composition form for a final color on gold and silver. Also on glass, and nothing seems to take its place for these purposes. Crocus is the same as rouge except that it is a coarser grade. Rouge is very much finer. All our Crocus and rouge comes from England. It is a form of iron oxide.

White Rouge is an imitation of red rouge or crocus, and was developed for the same purpose.

It is made from a fine high-grade water-floated silica, and has almost replaced crocus in the coloring of brass and copper; also on aluminum. It is also used largely for spotting oxidized copper, and sometimes used to color cheaper grades of nickel work.

It gets away from the objectionable color left by the red rouges, which is very important on work which has to be lacquered after coloring.

Emery cake and paste are practically the same, the difference being that the paste is made more greasy and with less grain.

Common grades are the 140, 150, 120, and F Grades.

In the writer's opinion the F grade in paste form is the most satisfactory and economical; it is also the lowest-priced.

This is because flour emery is a little cheaper than the coarser grain. It must also be borne in mind that the finer particles adhere better to the wheel than the coarser; this applies to any composition made.

A tallow compound used by many in preference to emery cake, is very adherent to the wheel and gives a fine finish;

seemingly it is very expensive, but when you consider how light in weight it is, how far it goes, and results obtained, it is not. This is made from pure tallow with just enough binder and waxes added to make it stick and not run away in warm weather.

Tripoli Composition is used more than any other buffing or polishing compound. It is made in many grades to suit the different classes of work. It is made in cakes usually about two pounds each, and in Tripoli compositions the higher grades are always the cheapest to use. This is because they have sufficient binder in them to be hard and are more adherent to the buff, and because they are made from all pure tripoli. Tripoli powder being very absorbent, requires considerable binder to take it up, thereby giving more lubricant to the buff or wheel. Cheaper grades are mixed with Silica, which makes them heavier and requires less grease and binder. The better grades are made from the finest double ground tripoli, which costs the manufacturer more and is much lighter in proportion to its bulk.

Tripoli powder comes in three colors: White, Cream, and Rose, and while the white is apparently a little harder, there is no noticeable difference in the cutting qualities of the tripoli composition made from the different colors.

This difference in color is caused by the water going thru the surface becoming charged with red clay or iron oxide and staining the tripoli rock (which is very absorbent) to different shades. A small quantity of the unstained white rock has to be hand-picked. Most Compositions are made from the Cream or Rose shades familiar to all tripoli users. (See article on the mining and preparation of tripoli, "Brass World," August number, 1921.)

Lime Composition, most familiar with the stove trade, is now very extensively used on all classes of nickel, being made in different grades to suit the work.

The lime compound originally was all made from imported lime, brought from Austria, and was commonly called Vienna lime. For many years, or until the war, it was the only Lime used for buffing compounds. Shortly after the war began, stocks of imported lime became exhausted and there was one grand scramble to get what was on hand; during this time every manufacturer was trying out domestic lime from all sections of the country, principally from Virginia, Vermont and Ohio. None seem to be the equal of the old imported lime, and for some time lime composition was far from what it formerly was. Finally the Wisconsin lime was

developed, and from here we are now getting a lime which is the equal if not superior to the old Vienna lime. The peculiar fact the writer has noticed is that while practically all lime-makers in this country burn their stone with coke or gas, the Wisconsin lime is wood-fired, and we understand that the imported Vienna lime was also wood-fired.

Lime Composition, to be kept any length of time, has to be put up in tin air-tight cans, and will keep for months if properly made and sealed.

Lime and Tripoli Compositions are sometimes put up in black form. This is accomplished by the addition of lamp-black, and on such work as brass tubing and fan-blades it is of some advantage. It leaves the work brighter and cleaner, getting away from a smoky appearance and giving a smooth white finish.

Many different greases, waxes and oils are used in Compositions, and each manufacturer have their pet formulæ. The base binder of them all is stearic acid, and the quality largely depends on how much of this binder is used. Stearic itself is made from tallow after having the red oil, glycerine, etc., extracted from it, and is very expensive in proportion to other ingredients. Still it is largely used in fine candles and high-grade soaps, and nothing has been found to take its place.

COMMERCIAL SILVER-PLATING OF LARGE COPPER TANKS

By E. J. Musick, St. Louis Branch

During the war, we were silver-plating the inside of large copper tanks holding 125 gallons of solution for one chemical concern, and large copper tanks holding 200 and 305 gallons for another concern.

When we were given the first 200-gallon tank to silver-plate, we had to make up about 100 gallons of new solution. Later on we were given a 305-gallon tank to plate and had to make up over 100 gallons of additional silver solution. Fond recollections of our previous experience with the deadly chlorine fumes, caused by cutting down several hundred ounces of silver in hot acid was enough for us to decide to try out Silver Cyanide, so we got 500 ounces of it and made up a much richer solution in silver than recommended by the manufacturers of the silver cyanide, as the balance of our silver solution was very high in metal, and tried it out and found it produced

a very nice deposit, though somewhat yellow in color, instead of clear, pure white. We used the following proportions:

Silver Cyanide	3½ ounces
Sodium Cyanide	4 9/10 ounces
Sal Ammonia	7/15 ounce
Water	1 gallon

To silver-plate the inside of a 305-gallon copper tank with a heavy and homogeneous deposit of silver without the slightest defect is a job that most platers would not care to tackle, but having done considerable similar work on smaller ones, we went to the task with confidence and plated a good many of them during the war period.

I will describe the method we used on the 305-gallon tanks. The tank is first given a preliminary cleaning by putting in a couple of gallons of acid bright dip and rolling around until the acid has covered the entire surface; then rinse and dry. The scale from the brazing at the joints and other imperfect spots are now readily seen and removed. The tank is then set up on a stand so that the bottom of the same is higher than the seven barrels that hold the silver solution. The tank having a 3″ hole in the center of the bottom, with a 6″ nipple on same, we connected an ell and pipe and gate-valve with sufficient 3″ hose to carry the solution into the different barrels.

Two of us then get inside of the tank, and with pumice and cyanide scour the copper surface thoroly, then use hose to rinse carefully and then quickly cover the surface by pouring a solution of mercuric nitrate until the copper is thoroly covered; then rinse quickly, close gate-valve and pour in solution as quickly as possible. It requires about four minutes for six men to fill the tank, while one makes anode connections and evenly distributes the 36 anodes, according to length and size. We have the current on and plating started before the tank is completely filled. Carefulness and quickness is necessary, on account of the amount of exposed surface.

We use a pressure of four volts for about 15 minutes; then drop back to one and one-half volts for about four hours, remove anodes and solution, scour the plated surface with white sand, pumice and water, give water and cyanide rinse, close gate-valve again and refill with solution. We plated these tanks from 12 to 24 hours, according to the amount of silver deposit desired.

The heavy cast mixing-paddle, weighing about 240 lbs., was plated in our regular tank, one half at a time, being suspended by a block and tackle. We used two volts on the cast paddle,

and scoured every 2 or 3 hours, according to the condition of casting.

In plating the 125-gallon tanks, we had to be extremely careful to get a very close homogeneous deposit, as these were used by a chemical concern that was manufacturing 86.5° caustic potash. These tanks were set over a specially-constructed hot blast furnace that boiled the molten mass of caustic at 600° of heat. The first two tanks we plated, the plating withstood the action of the hot caustic up to the strength of 76°, then the copper was reached thru the pores in the deposit and the copper was acted upon very readily, in fact at that strength and temperature it could eat a hole thru a piece of copper one-quarter of an inch thick in less than an hour.

Discoloration of the pure white molten caustic indicated that the plating had been penetrated, and it would be immediately removed. This trouble was overcome by refiltering our solution and plating with a voltage of one instead of one and one-half volts, and scouring every two hours, thus giving a silver deposit of a much finer texture.

COPPER-PLATING

By H. J. Dumas, St. Louis Branch

Some of the work we plate is an article with a steel handle, (soldered parts), and the body or main part is tinned. This is plated without any preliminary cleaning.

This work is plated, oxidized, spotted, or cut thru oxidize to show the copper color.

We plate and copper buff other soft metal surfaces; also a steel wire fender that is spot welded, pickled, and copper buffed.

We have two steel tanks; one is a 145-gallon tank, and the other is a 330-gallon tank. The small one is essentially the cleaning tank, but is sometimes used for both cleaning and plating, according to the class of work being done.

The large one is the plating-tank; the positive wire is connected by being bolted to the tanks; each tank has one cathode or work rod, which is insulated from the same. The anodes are hung on the sides of the tanks.

Both solutions were made up of 1 oz. sodium cyanide, 1 oz. copper cyanide to the gallon, and the amount of cleaning compound given in the formula.

This method was followed for some time in renewals, until we found that nothing but free cyanide in excess to what we had been using would remove a slight oxidization from the work we were plating. Since then no formula has been followed.

The cleaning-tank is run very low in metal content, and when work is to be plated only in this tank, it must be of good color and the plating smooth, or it has to be made so.

It has happened that the work came out looking more like brass than copper: this was on a bowl-shaped piece of work that we oxidized. The parts where the current was the strongest would not oxidize in the polysulphide solution, but remained yellow and the work was rough. We overcame this by dissolving copper cyanide with sodium cyanide in a separate vessel, and adding it to the solution until the work showed a good copper color. This did not happen often, but when it did, it was always after an addition of caustic soda, and when the solution was very low in metal.

Free cyanide would not bring back the copper color; it only made the work rougher.

It was intimated that the yellow color may be due to some dissolving action of the solution upon the softer metals. This seems reasonable and may be true to a certain extent, but we consider an excess of caustic soda as the real trouble-maker, yet we consider it the best cleaning material.

We noticed that with but few exceptions, almost all roughness is due to deficiency of cyanide, as very little metal is required in the hot solution, especially if a good anode surface is maintained.

The working conditions of the plating-tank differ from the cleaning-tank only in this way: It has more metal and less of both the caustic soda and free cyanide.

At one time we tried to remove the black oxide from the anodes by adding free cyanide which formed more rapidly after caustic soda was added; cyanide did not clean the anodes; it made the work rough and hard to buff. Then metal was added; it seemed to do more towards cleaning the anodes than the cyanide. The solution, after being at rest for a short time, dissolved the black oxide. This was tried several times when conditions would permit, and the addition of small amounts of metal which would not increase the density of the solution too much.

Both of these solutions have been kept up in metal content without the addition of copper cyanide from two to three

months at a time, by the adding of free cyanide at the close of the day's work.

It is impossible to plate in either solution if cold, as they plate best near the boiling point. The steam coil in the cleaning-tank is on the bottom; it heats and plates from the bottom up. In the plating-tank the coil is on the side; the steam enters at the top and it plates from the top down, until the solution is heated thru.

Most all of our work is plated on racks. It is first run thru the cleaning-tank, rinsed in clear water, and finished in the plating-tank.

The time it takes to plate the general class of our work, passing it thru both tanks, is from 8 to 10 minutes.

New solutions are made up of 1 oz. of copper cyanide, 1½ oz. sodium cyanide, 6 oz. caustic soda to the gallon.

ELECTRO-GALVANIC SOLUTIONS AND THEIR APPLICATION

By F. Horath, St. Louis Branch.

In these papers we will deal with the subject of coating iron and steel articles with zinc-plating; in other words, cold galvanizing.

Zinc is, without doubt, the best protective coating for prevention of rust. It is difficult for many persons to understand why zinc is the best rust preventive, as they believe it is on account of its cheapness that it is so much in use, and they also have an idea that lead, being a cheaper metal, would anwer the same purpose, that it is more non-corrosive than zinc, and would be a better protector for metal products. This is not a fact, however, which, according to different authors and writers on zinc-coating, will be explained.

The very fact that zinc is a corrosive metal does not affect its properties when applied as a coating to iron and steel. If it did not corrode, it would not be of value for such a purpose. When iron or steel, which has been plated with zinc, is exposed to the air, a galvanic action is set up. Although extremely slight, the result is, therefore, that with the slight galvanic action set up on zinc-plated products when exposed to the air, a corrosion takes place. In this case, the zinc being the electro-positive metal, suffers corrosion at the expense of the electro-negative metal. The effect is that the corrosion goes on with the zinc and the electro-negative metal is not

corroded at all; that is, provided there is any zinc plate left on the articles plated.

Other metals, like lead or tin, on account of their not being electro-positive to iron or steel, do not act like zinc. They act simply the same as a covering of paint or varnish, and if portions of the iron or steel happen to be exposed, even as much as a pin-hole, the iron will begin to corrode, and the result is rusting. With zinc-plating this will not take place.

There are in general use, two kinds of zinc-plating solutions: the Acid or Sulphate, and the Alkaline or Cyanide solutions.

Alkaline Zinc Solution

There are a number of formulas for zinc alkaline solutions consisting of carbonates and the metal-cyanides, which have their sphere of usefulness. Articles made of steel, such as sheetmetal rods, bolts, nuts, angle and tee iron, etc., can be plated with a good uniform deposit, the thickness of the deposit depending on the time allowed for plating. Cast iron and malleable iron, or any castings of a porous nature, which have to be pickled in an acid, do not plate in an alkaline zinc solution. That is one advantage of using an acid zinc solution.

The formula for alkaline solution, which I am using at the present time, is made up as follows:

Sodium Cyanide	4	ounces
Zinc Cyanide	4 ½	ounces
Caustic Soda	2	ounces
Water	1	gallon

Plate with from four to six volts

In mixing this solution, dissolve the sodium cyanide in hot water, then add the zinc cyanide. When all is dissolved, let cool, then add the caustic soda (do not put caustic soda into hot solution). The gravity of this solution, when made up to obtain good results, should be between 9° and 12° Baumé. When solution shows less than 9°, it indicates that the bath is in want of metal. When the gravity of the bath is more than 12°, reduce your bath by adding water. If the bath plates slow, add sodium cyanide and zinc cyanide, one ounce of each, to the gallon of solution. If solution does not plate well into deeper recesses, add a little caustic soda. Do not add too much, or your work will plate out dark. If you are using a high voltage, too much caustic soda forms a dark oxide on the anodes, which prevents the current from passing freely thru the anodes. If the anodes show up with a heavy dark oxide, it indicates that the bath is in want of cyanide,

although there is always a slight oxide on the anodes, even when the bath is in good working order.

To brighten up the deposit, I have of late been using Aluminum Sulphate, one-half ounce to the gallon of solution.

I am using cast zinc anodes in this bath. As to preparing the work to be plated in this bath, any method which you use for any other plating can be used. The main point, however, *the work must be clean.*

For zinc-plating malleable or gray iron castings, an acid or Sulphate of Zinc solution must be used. The formula I use is as follows:

Zinc Sulphate	2½ pounds
Aluminum Sulphate	4 ounces
Magnesium Sulphate	6 ounces
Ammonium Chloride	2 ounces
Boric Acid	2 ounces
Water	1 gallon

NICKEL-PLATING BRASS CASTINGS

By W. J. Flannery, St. Louis Branch

The principal classes of work we have to plate are valves which have very sharp edges. They require a very good deposit of nickel on account of being finished with a soft buff. In order to save time in cleaning, I use an alkali solution of five to six ounces per gallon, leaving them in about twenty minutes, then rinsing in cold water and a light brushing, then thru the cyanide and it is ready for the plating-bath. My solution is made up as follows:

Double Nickel Salts	6 ounces
Single Nickel Salts	14 ounces
Boric Acid (per gal. of solution)	2 ounces

running the solution up to 10° or 12° Baumé. I get a good deposit in forty to forty-five minutes.

Having everything ready for work, we must know before going further, what takes place in the nickel solution during electrolysis. During electrolysis, both the sulphate of nickel and the sulphate of ammonia undergo decomposition. Sulphuric acid and ammonia being set free at the anode, this sulphuric acid forms an equivalent quantity of sulphate of nickel by its action on the anode which it dissolves, free ammonia is liberated, some of which is left to accumulate; this will make the solution decidedly alkaline in time, and the more in-

tense the electric current the more rapid the decomposition, hence the more ammonia is liberated and the more alkaline the solution becomes.

Accompanying this change in the solution, especially with an irregular or too intense current, there is a precipitation of the nickel in the form of basic salt, by which the metallic strength of the bath is impaired. This necessitates the addition of fresh nickel salts from time to time.

Hydrogen and nickel are given up at the cathode, the nickel being deposited on the work and most of the hydrogen liberated, which makes the deposit brittle and strip, especially if the nickel deposit is heavy. This is due to the hydrogen being taken up by the electro-deposited metal.

Knowing what occurs in the bath during electrolysis, we will look into what is necessary for the proper working of the solution.

A current of moderate intensity (about two volts), only just enough ammonia will be liberated to combine with the sulphuric acid, forming sulphate of ammonia; therefore, the difficulty of the solution becoming alkaline is reduced to a minimum. The deposit of nickel on the work should be tenacious and adherent, but if the current is too weak the deposition will be too slow and also the solution may crystalize on the anodes; on the other hand, if the current is too intense the deposit is apt to burn, that is, the metal deposited will be a dark gray or black color with a rough surface.

A large anode surface should be employed. Nickel is so difficult soluble that if the anode surface is not considerably larger than the object to be plated, the solution will not be kept up in strength; more nickel will be deposited on the work than is dissolved by the sulphuric acid, which is one of the component parts of the double sulphate nickel solution, and the solution will in time contain a great deal of sulphate of ammonia and very little sulphate of nickel, thereby weakening it in nickel. Another reason for a large anode surface is that nickel solutions are feebler conductors of electricity than either gold, silver or copper. On this account it is necessary to employ a stronger depositing solution and a larger anode surface to make up for the want of conductivity.

Cultivate a cheerful frame of mind and keep a fire of warmth in your heart at all times. Trouble is always peeping around the corner of the house in which a long face and a cold heart live.

THE USE OF NICKEL CHLORIDE IN A NICKEL SOLUTION

Hedley J. Richards, Former Editor of the "Review."

If Electro-platers in general were aware of the efficiency of Nickel Chloride in a Single Salt Solution, this material would become in common use. Almost all single salt solutions are composed of Nickel Sulphate, Boric Acid, with the addition of a suitable chloride. This chloride is as a rule either sodium chloride or ammonium chloride. There are two other chlorides which are used to a much lesser extent, that it, by fewer platers. These are Magnesium Chloride and Nickel Chloride. The order of their popularity or general use seems to follow the selling-price of the article. Common Salt coming first, with Sal Ammoniac a good second, Magnesium Chloride and Nickel Chloride being a poor third and fourth, respectively. Now all these materials are used for their chlorine contents, the purpose of which is to give added conductivity to the solution and aid in the electrolytic reduction of the nickel anode; also to lessen the amount of acid produced at the anode and to prevent the anode from becoming passive.

Dr. Watts in his widely published experiments on Rapid Nickel-plating, proves beyond a doubt the advantage of nickel chloride over other chlorides.

Dr. Watts recommends that the nickel chloride contents be obtained by adding nickel carbonate to the dissolved nickel salts, and heating until all acid is neutralized. The boracic acid being added after the solution is filtered. In this solution used hot, Dr. Watts plated at the astonishing speed of over 100 amperes per square foot.

NICKEL-PLATING STEERS BY A STEERER

By Hedley J. Richards

One January evening this year,
I was reading a right thrilling tale,
When my phone bell alarm rang out clear;
H. Williams' voice answered my hail,
Said he, on this telephone call,
We've got to fill one whole REVIEW,
I want you to help out and not stall,
So there's two pages coming to you;
Now to argue with Herbert it simply don't pay,
So about nickel-plating, here's all I can say.

Don't have your solution too dense,
If you do, you've used too little water,
And to have it too weak shows no sense,
For then you've used more than you ought'er.
Now, too much free acid is bad,
'Cause the acid contents are too strong,
And alkaline tendencies sad,
A solution like that is quite wrong.
Have your work polished smooth, if you don't it's too rough
Don't buff it too much, but just buff it enough.

Don't have your solution too cold,
If you do, it is quite apt to peel;
And besides that, it always plates slow,
And is quite icy cold to the feel.
Don't have your solution too hot,
Keep the temperature at the right height;
Have all things correct to the dot,
And your plating will always be right.
Observe these instructions and follow them strong,
Because if you are right, you just cannot be wrong.

BRASS-PLATING

By F. E. T., St. Louis Branch

Brass-plating has always been considered one of the most troublesome and difficult problems in the art of Electroplating. The reason is simple, for the Plater is called upon to deposit an alloy of two different metals which must be deposited in certain proportions to produce the desired results. The color of the deposit is affected by the composition of the solution, by the current density, by the effectiveness of the anodes, and by so many factors, that the color you don't want is generally the color you obtain.

More formulæ have been published for brass solutions than any other kind of plating, but of late years brass-plating has been put on a more secure and certain footing.

The production of more reliable chemicals, notably the metal cyanides and sodium cyanide, the steady improvement in plating-generators and rheostats, all tend to take the guess out of brass-plating and substitute certainty.

A brass solution must contain copper and zinc cyanide, therefore as these two salts are commercially obtainable, why waste time in making your own metal cyanides from the carbonates, loading up your solutions with inert salts, and making a bath that will aways give uncertain results?

Some platers use part copper anodes and part zinc anodes, endeavoring to control the solution and color by withdrawing either the zinc or copper anodes as the state of the solution appears to demand it. The great majority, however, use a cast brass anode, and a cast brass anode of the color desired to deposit must be considered the logical anode, and for average color the 65% to 75% copper and 35% to 25% zinc mixture is about right.

Warm solutions can be used to advantage, but changes the formulæ considerable, requiring more cyanide and less zinc.

Platers are often troubled with spotting-out of the cyanide when plating directly on coarse iron, and this is a matter hard to overcome, and while nickel-plating the castings before brass-plating will help to prevent this, ofttimes the article to be plated is so cheap that it will not stand the expense of double plating.

My experience with spotting-out is that I never yet have found a plater who could guarantee to eliminate it on all classes of work, but it can be kept down to a minimum if handled right, and I found the best way was that after taking from the bath and rinsed, they were soaked well in acetic acid solution, and then immersed in cold running water for several hours, then baked at high temperature for several hours more, which seemed to dissolve out and crystalize the cyanide on the fly-speck ring around the pores, so that the scratch brush or buff would remove and prevent it from appearing after being lacquered.

I want to touch on one peculiar phase of brass-plating which is zinc red or orange color sometimes appearing on work, and which we are too apt to take as lack of zinc in the solution, when in reality it is an excess of zinc which causes this, and, of course, the remedy is not more zinc, but more copper with reduction of current till excess of zinc is worked out; also in this case dipping the anodes will help. This curious phenomenon can be identified by the plater, because this so-called zinc red, always appears on projections or corners of the cathodes.

The addition of liquid ammonia helps to give a brighter deposit. Years ago arsenic was considered the best chemical for bright brass-plating, but it had to be used with so much care, was so hard to dissolve, and so very troublesome, if used to excess, that today, so far as I know, it is seldom used. It can be dissolved fairly well in cyanide on a Bunsen Burner, and kept in a stock bottle from which a very small quantity can be added to the solution as needed, about once a month.

To clear the solution bisulphite of soda can be used in preference to hyposulphite, as action does not seem to be so severe, and this sometimes seemed to bring up a bad brass solution when no other manipulation would seem to do the trick.

In conclusion, the high price of brass of late years has stimulated brass-plating considerable, and an ever-increasing amount of goods being marketed, which was formerly solid brass, but which are now electro-plated, means more work along this finish, and it behooves the plater to keep up on this finish. Brass-plating is so interesting, so useful and has such a big future before it that it will pay every plater to make a study of it.

LEAD-PLATING

By H. Deubelbeis, St. Louis Branch

When first called upon to do lead-plating, I did quite a lot of experimenting with alkali solutions. I got a fair deposit, but I could not get a very heavy one. I was plating eight-inch shells, and as the shells were from one-half to six pounds under weight, I had to get a very heavy deposit.

The solution I used was made up of the following chemicals:

Water	1 gallon
Hydrofluoric Acid	2 pounds
Boric Acid	12 ounces
Lead Carbonate	1 pound

At first I used a small amount of glue, but by agitating the solution would foam over the tank. By eliminating the glue this foaming was remedied. This solution should be made up in a well-ventilated place, for when the acids are mixed a heavy gas is created. The lead carbonate is made into a thin paste and added to the acids very slowly to prevent boiling over. At times, I found it necessary to use a little cold water to prevent it from boiling over.

TIN-PLATING

By Charles T. McGinley, St. Louis Branch

My work consists of tin-plating coils and timers for ignition on automobiles. They are made from sheet steel and come to the plating-room very rusty and greasy, and are hard

to clean. I have found the best way to pickle them is in hot muriatic acid about 1 to 5. After cleaning the grease off, they come out of the acid very white and plate very fast. The tin solution that I use is composed of the following:

Caustic Soda	1 pound
Hypo	¼ pound
Tin Chloride	¼ pound
Water	1 gallon

The solution is worked hot, about 170° and 2½ volts. The solution must be kept strong in caustic. If the work comes out dark, I add about ½ lb. of Sodium Cyanide to the tank (about 200 gallons). I let the work run a half hour, and if by chance I let it run too long, I will have the tin coated in a nice spongy mass, which will rub off very easy. If that should happen, which it did once, the quickest way to repair it is to brush on a wire wheel. The tin is put on to prevent it from rusting, and so that they will solder easily, as they are painted after they are assembled.

All the work must be plated on the inside. That means that you have to throw the plate in a 2″ hole about 4″ deep.

I have had very good luck in tin-plating in a barrel on small parts, using the same solution, only with higher voltage. Tin-plating is being replaced by copper, which is much cheaper.

NICKEL-PLATING

By George J. Brandt, St. Louis Branch

In mixing my nickel-plating solutions, I use 12 ounces of nickel, Ammonium Sulphate (double nickel salts) to a gallon of water, add 5 pounds of Boric Acid to a 300-gallon tank. I add nothing but 1 pint of ammonia every month or six weeks. This mixture gives me A1 results. My work is to plate all parts of the auto, from screws to radiator shells.

In my former place of employment the solution was there when I came, and all I ever added was nickel salts and ammonia in the eleven years I was there, and a very small amount of work ever peeled.

Kindness is strength—to be tender toward people is to sensitize your soul. It is a great thing to acquire.

There are two sides to life—the shadow side and the sunny side.

TO REMOVE EXCESS CARBONATES FROM SILVER SOLUTION

By A. Giroux, Montreal Branch

An easy and cheap way to remove carbonates from an old silver-plating solution is by freezing the solution, which can be very easily done in the winter season.

I had an old solution which marked 18° Baumé and had been in use for 18 years. This solution had been maintained by adding silver chloride, dissolved in cyanide, until it became so rich in chlorides and carbonates that it had refused to work properly. Instead of precipitating with Barium cyanide, I took the solution from the tank and placed it in tubs on the roof of the shop, and the next morning I found that the carbonate had crystallized in the bottom of the tubs. I put the solution in the tank and found that the solution was two inches lower, owing to the bulk of the carbonate crystals remaining in the tubs. After adding water, the solution is going fine.

Some years ago I used Barium cyanide in another solution, after which the solution was found to have a large excess of cyanide. The result of the freezing process seemed to give the opposite result.

I firmly believe that the freezing process is the best and most simple way to remove excess carbonates from cyanide solutions.

CORRECTION*

Some mistakes have been made in the translation of my article from the *Die Metallwaren Industrie und Galvanotechnik*, a German magazine. I am trying herewith to correct these mistakes which made an understanding nearly impossible.

In the *first* paragraph it should read as follows:

"As a substitute for ammonium sulphide $(NH_4)_2S$, liver of sulphur, K_2S, and hydrogen sulphide, H_2S, flowers of sulphur and lime are used. In order to prepare this stock solution, place 2 lbs. of common lime (quick lime, CaO), and one pound of flowers of sulphur into about 5 quarts of water, and then boil this solution until it turns yellow (after about an hour); when this takes place the stock solution is ready for use.....", etc.

. The Editor takes no responsibility with regard to the above mistakes in translation, having printed the article as read at the Indianapolis Convention.

In the *second* paragraph on "BLACK COLORING ON IRON," it should read as follows:

"In lieu of 1 liter....." etc., it should be: ".....1 gal. of water, 16 c.c. of sulphuric acid, 2.6 oz. of antimony sulphide (gray) Sb_2S_3....." etc.

The title of the next paragraph should be: "PICKLES ON SCALED IRON AND STEEL."

In lieu of 5 liters, etc., it should be: "1 gal. of water, 70° F., 10-14 oz. of sodium bisulphate, $NaHSO_4$, 3-5 oz. of common salt, NaCl....."

"A SUBSTITUTE FOR A BRIGHT-DIP MADE FROM NITRIC ACID" should be the title of the *fourth* paragraph.

In lieu of 10 liters, etc., it should be: "1 gal. of water, 4 lbs. sulphuric acid or muriatic acid, 13-15 oz. of potassium or sodium bichromate, $K_2Cr_2O_7$ or $Na_2Cr_2O_7$. If chromic acid is on hand, it may be used instead—8-10 oz. of it will do—. If there is neither the chromate nor the chromic acid on hand, nitrates may be used in the following proportions.... dissolve 13-15 oz. of sodium or potassium nitrate ($NaNO_3$ or KNO_3 in one quart of water and pour this solution into a mixture of 3 quarts of sulphuric acid and 3 quarts of water...."

In the article on "WHITE WAR METAL" (pp. 6 and 7), it should be:

In lieu of 1 liter, etc., as follows:

I) 1 gal. water and 10 oz. copper sulphate $CoSO_4$.

II) 1 gal. water and 12 oz. washing soda (crystal).

Pour I and II together into a wooden or stoneware tank. In one gallon of water dissolve the following substances in the meantime: 10 oz. of sodium or potassium cyanide, 3 oz. of potassium carbonate, and 1 oz. of boric acid. When these substances have all dissolved, add this solution to the above solution in the stoneware or wooden tank. The resulting solution is a good copper solution ready for use.

COPPERING OF WHITE WAR METAL OR ZINC, (p. 7).

The proportions of the substances in the last part of this article should be as follows: to one gal. of warm water 4.5 oz. of copper sulphate ($CuSO_4$) and 4 oz. of cream of tartar are added. When these substances have dissolved, add 8 oz. of sodium or postassium hydroxide to this solution. This solution is to be used when cold.

The title of the next chapter should be: "OXIDIZED-SILVER-IMITATION ON TIN-PLATE" (instead of the OLD SILVER ON TIN-PLATE).

The proportions should be as follows: 1 quart of water and 10 oz. of copper nitrate $Cu(NO_3)_2$.... etc.

GRAY COLORING ON ZINC SHEETS should be the title of the next chapter.

Instead of ½ liters of water it should be: "The following

substances should be dissolved in one quart of water: 1 oz. of chromic acid ($Cr.O_3$), then 1 oz. of sodium thiosulphate ("hypo") $Na_2S_2O_3$, $5H_2O$), and finally 1.5 oz. of sulphuric acid H_2SO_4.

This solution is to be used when cold by immersion.

BROWN BRONZE ON METALS.

1 gal. of warm water at 90° F.
2 oz. of golden sulphuret of antimony Sb_3S_5.
1 oz. of potassium hydroxide KOH.
5.5 oz. of ammonia water NH_3.

This solution is to be used by immersion.

JOSEPH J. TRISKIA.

WHAT THE BRANCHES ARE DOING

NEW YORK

The regular meetings of the New York Branch were held on January 13th and January 27th. President J. A. Stremel presided. Four applications were received and two were elected to membership.

The first meeting of January was mostly taken up by the Banquet affairs, it being a regular business meeting.

Our second meeting, as a rule, is devoted to good and welfare, and brings out some old-timers, having with us Mr. George Hogaboom, Mr. Matoon, Mr. Smith and a few others, which made it a very interesting evening. The following topics were discussed: What is the average capacity of an ordinary glass carboy? Answer: There is no standard capacity. As a rule they run from 9 to 12 gallons to the carboy. A lengthy discussion took place on trying to get the chemical houses to standardize the size of carboys; also to make better and stronger boxes to safeguard our help in handling the same.

Question No. 2: Which is the correct cubic inch capacity of a gallon, 231 or 232? Answer: The figure 231 is correct.

Question No. 3: What is a good solution for stripping off steel screws without injuring threads? Answer: Use concentrated sulphuric acid and sheet lead for anodes, and keep away from steam and water.

Question No. 4: What is the cause of white spots on work after silver-plating; goods are nickel-plated, then run in strike and silver-plated? Answer: Several reasons were given, but without satisfaction. Answers given the following meeting. Rinse work in a clean, hot water after nickel-plating; the gentleman reported no bad work since he is rinsing in hot water.

Question No. 5: What is the cause of a nickel solution giving a pink deposit after adding salts, and leaving work hang in tank without current? Answer: It is caused by copper being in the nickel salts. The best way to remove the copper from solution is to hang a nickel-plated object in the solution over night until pink deposit don't show up.

Question No. 6: What is the cause of the armature hugging one side

of the generator? Answer: Due to imperfect mechanical conditions.

INFORMATION WANTED: What is a good dip to remove a light film that appears on antimonial lead castings.

NEW YORK

Kindly correct Question No. 2 in the January REVIEW to read:

QUESTION NO. 2—Is Platinic a good oxidizing solution for Dutch silver?

ANSWER NO. 2—Yes. Use 1 oz. of Platanic, 4 oz. of muriatic acid, and 4 oz. of water. Heat until dissolved; add one-half gallon of muriatic acid and one-half gallon of water.

PH. MORNINGSTAR, Rec. Sec'y.

BRIDGEPORT

Our first meeting of the new year was held on January 20, in the Laboratory, with 24 members present. Our President, Mr. Slattery, called attention to the fact that L. J. Maraffi, our Secretary for the past two years, had accepted a position in New York City, and intended to reside there. We regret that Mr. Mariffi is leaving us, and appreciate his faithfulness as Secretary of this Branch, and extend to him our best wishes for success in his new position. A motion was made and carried to appoint Mr. F. J. Spaine, Secretary pro-tem. A committee of two, Messrs. D. J. Fleming and G. J. Karl, were appointed to assist the Secretary pro-tem. The minutes of the previous meeting were read and accepted.

It has been the aim of this Branch to have a special speaker at all our meetings, and we have been very fortunate in getting men who are connected with various manufacturers to give our members a talk on their product. We have gone down the line from anodes to the finished work, and are now getting into solutions.

To start with we were able to get Mr. Coleman of the Scovill Mfg. Co. of Waterbury, Conn., to give us a talk on nickel solutions. Mr. Coleman gave a very interesting talk, and demonstrated the Bureau of Standards system for testing nickel solutions. At the conclusion of his talk a rising vote of thanks was given him.

We are more than pleased at the attendance at our meetings, and our regular Friday night roundtable talks are becoming larger and larger, which shows that our members are on the job to get any new ideas and to help each other.

Our February 17th meeting was held in the laboratory with a very good attendance, J. W. Slattery presiding. We are very happy to say that after three weeks' illness, Mr. Slattery is with us again. One application for membership was read.

It is with profound regret that we are obliged to announce the death of one of our fellow-members, H. J. Blanchard, of Niagara Falls, N. Y. It was therefore decided to instruct the Secretary of this Branch to forward a letter of condolence to his family. An air paint sprayer was loaned to our Branch for three months, and it is our intention to make good use of the same.

PHILADELPHIA

The Philadelphia Branch held its regular monthly meeting on Friday, February 3rd, President Geo. Gehling presiding, with a good attendance.

Information wanted on: Why is glycerine added to an Electric Nickel Strip of Sulphuric Acid?

ST. LOUIS

Our regular meeting of February 4th was presided over by our Librarian, George Lamkemeyer, who is always on hand. The attendance was unusually small, many of our regulars taking a night off for various reasons. Ed Musick had to doll up to go to a society event, while our President, Charles McGinley, is taking care of a cold. Even Hedley had to look over his golf clubs in anticipation of a chance to go the limit. Others failed to report.

Mr. Whitehead of Cincinnati Branch was a visitor, and gave a report of the good things in store for the visitors to the Convention this year. While their committees have been handicapped, all are now on the job, and will make the trip to Cincinnati of immense value to every plater.

Frank Rushton who for over one and one-half years has been in Mexico, enjoyed the meeting with us, and told of some of his experiences. He again joins the ranks of the associate members.

The subject of the evening, "Care of Plated Goods in Stock," was discussed after leads by F. Menniges, J. Humbrecht, and H. Siemers.

INDIANAPOLIS

February 11th a regular meeting and smoker was held which was well attended. Only necessary routine work was gone through, the rest of the time being taken up with smoking, drinking good cider, and eating doughnuts.

Mr. Hass, formerly of New York, who was with us made some remarks and said he expected to see us some more in the future, as he is now located near us.

Mr. Humphries of Kokomo, Ind., spoke on the Rust-proofing of Iron and Steel with the different methods, such as Hot Galvanizing, Cold Galvanizing, Sherrardizing, Parkerizing, etc., explaining the different processes ogne through and the wearing qualities and durabilty; then explained the process of coating the metal with Cadmium. He said that such a coating has proven to stand a much longer salt spray test than the other processes. The subject was very interesting.

DAYTON

On Saturday, February 4, occurred the meeting of the Dayton Branch, which was very largely attended and which was addressed by Mr. Edward L. Reed, Patent Lawyer, who spoke quite at length on patent laws, bringing in commercial patents pertaining to the development of new processes or new equipment, and also set forth the relation of employer and employee in getting out patents, and his talk, while a little out of our regular line, proved very interesting.

A committee was appointed to arrange for the next meeting, which will be our ninth anniversary, and will be in the form of a dinner given at the Y. M. C. A. Dining-room, and will be addressed by a Research Engineer from the N. C. R. on Barrel Copper-plating Before Barlonizing.

The Membership Committee reported excellent progress, and expect to have quite a few applicants in the near future.

The Convention Committee is starting to work on plans to get a large atendance at Cincinnati for our next Convention.

CONNECTICUT VALLEY

The Connecticut Valley Branch A. E. S. held their house-warming on Tuesday, February 14th, at 202 Washington St., President James A. Bagshaw presiding. After the regular routine of business was finished, Mr. E. N. Miller, Librarian, took charge of the meeting. He introduced Mr. Floyd T. Taylor, Electrical Engineer. Mr. Taylor gave us an illustrated talk on Plating-rooms, Compound-wound, Shunt-wound and interpolar dynamos. His talk was very instructive. He explained how important the dynamo was to the Plating-room. At the conclusion of his remarks a rising vote of thanks was extended him. We hope to have Mr. Taylor with us again in the near future.

Next on the program was the musical entertainment which was thoroughly enjoyed by all present.

And last but not least, was the fine lunch served. Every one seemed to enjoy this part of the program. Our Past-President, Mr. H. R. Macfayden, makes a fine chef when it comes to serving a lunch; also, Mr. E. M. Stephenson comes in for his share of good work done.

It was the largest-attended meeting we have held, fifty being present. We hope the good work will go on.

MILWAUKEE

An educational meeting was held on Thursday, January 26th.

QUESTION NO. 1—Want a good stop-off varnish to be used in a hot gold solution.

ANSWER NO. 1—Use Bakelite Lacquer, which can be removed with alcohol, or use Asphaltum dissolved in Turpentine; this can be removed with turpentine, then with benzine or gasoline.

QUESTION NO. 2—In zinc-plating by the barrel process, articles leave the solution with a white, nice color, but turn dark blue or black when dried. The water for rinsing, also the hot water, was clean. Various ways were tried for drying, but results were always the same. Articles plated by the same solution, by still process, were not affected. The solution used was an acid solution, composed of Zinc Sulphate, Sulphuric Acid, Sodium Chloride and water.

ANSWER NO. 2—(a) Work evidently was not plated heavy enough. (b) Solution evidently not dense enough. (c) Raise the voltage from 6 to 12 volts. (d) Work plated in a zinc sulphate bath should never be rinsed in water or dried in sawdust in which work from a cyanide bath has been rinsed or dried.

QUESTION NO. 3—Is tin or any of its salt soluble in cyanide; if so, to what extent?

ANSWER NO. 3—Tin salts are soluble in cyanide.

Formula for Tin Chloride Solution

Pure Water	1 gallon
Sodium Cyanide	1½ oz.
Tin Chloride	2 oz.
Caustic Soda	2½ oz.
Carbonate of Lead	⅛ oz.

Use at 120° tot 160° Fahr.; use 2 to 3 volts. This solution will give a heavy deposit in 10 minutes.

QUESTION NO. 4—What is the simplest method for obtaining the metal content in a nickel solution?

ANSWER NO. 4—Determine the value of a cyanide solution against a nickel solution of known strength.

QUESTION NO. 5—What is the best lubricant to use in ball burnishing steel before plating?

ANSWER NO. 5—Make a stock solution of 25 lbs. neutral soap chips, 12 lbs. of soda ash, dissolve in about 10 gallons of warm water; dilute this stock solution when filling the barrels.

Trisodium Phosphate dries on the work.

GRAND RAPIDS

The regular monthly meeting of the Grand Rapids Branch was held at the Vocational High School in the form of a smoker, with President Whalley presiding. We are planning a banquet in the near future, and a committee was appointed to attend to the arrangements.

We had the pleasure of having Mr. R. J. Hayucka with us who made things interesting every minute, and the absent members missed something by not attending.

GRAND RAPIDS QUESTION-BOX

QUESTION NO. 1—What is wrong with a cyanide zinc solution that begins to give unsatisfactory deposits and practically stops plating?

ANSWER NO. 1—The solution has become high in carbonates, and the trouble can be overcome by adding caustic soda or throwing part of the solution away and adding new solution.

QUESTION NO. 2A—Which will tarnish first, a piece of steel that has been copper-plated and then nickeled, or a piece of steel that has received a nickel plate directly upon it?

ANSWER NO. 2A—The piece that has been copper-plated will tarnish first.

QUESTION NO. 2B—Why?

ANSWER NO. 2B—Due to the porosity of the nickel plate, the copper plate will become affected, which will in turn affect the nickel.

QUESTION NO. 3A—When two pieces of steel are nickel-plated the same length of time under the same conditions, one copper-plated and buffed, the other nickeled directly upon the steel, which will cut through first when buffed under the same pressure?

ANSWER NO. 3A—The piece that has been copper-plated will cut through first.

QUESTION NO. 3B—Why?

ANSWER NO. 3B—It was generally conceded that the coppered article had received a finer grain deposit, and some voiced the opinion that the plate was softer.

QUESTION NO. 4—Which needs the more current for the same thickness of deposit, a solid brass ball or a hollow ball of the same dimensions?

ANSWER NO. 4—Due to the resistance offered by the surplus amount of metal, the solid ball will require the greater amount of current.

NEWARK

The regular meeting of the Newark Branch was held on Friday evening, February 3rd, at No. 22 Central Ave., Vice-President Sizelove presiding in the absence of President Sievering.

A good part of the evening was taken up by discussing plans for the coming fourth annual banquet, to be held on Saturday evening, April 22, at Achtel-Stetters, 842 Broad St. Several new features are being planned for this banquet, which should make it the best ever, as the committees in charge of the various features are experienced "veterans" and hustlers.

Our able Librarian, Mr. Faint, sprung a new stunt, which we call personal experience discussions; it works out something like this: each member is asked to describe his department, the equipment, work and finishes produced, and then to answer questions. It is surprising how many interesting discussions develop and how much useful information is being brought out in this way. It gives every member the benefit of every other member's knowledge and experience to the fullest extent. These "experience meetings" have proven so interesting that they will be continued until all the members have had a chance to state their experiences.

Mr. Pierdon, of the New York Branch, was a visitor, and read an excellent paper on Plating Racks, in fact, this paper was so interesting that it will be turned over to the Editor for publication in the REVIEW.

DETROIT

The illustrated lecture by M. G. Kopf on the subject of Corrosion of Metals was attended by an appreciative audience of about 300. Mr. Kopf interested them every minute and all felt that they had gained some interesting facts due to his careful research work and recording of data on this subject. Samples of metal showing the cause and effect of corrosion, and interesting illustrations brought out the points in a comprehensive and impressive manner. The representatives of many of Detroit's manufacturers who attended this occasion have reason to appreciate what our Society is doing for their industries.

Our regular monthly meeting was well-attended and a paper presented by Mr. H. Frank on Rust-proofing of Steel Automobile Parts by the Zinc Process was very interesting. As soon as certain tests are com-

pleted this paper will be revised and sent in for publication. Some members who are familiar with Cadmium plating are skeptical about it, as some tests of work done fail to show any superiority over carefully done zinc-plating.

Cadmium-plating may have advantages over Zinc, and if so we are willing to be shown.

If a method of enameling over zinc can be evolved that will prove durable and satisfactory, many automobile parts could be greatly improved. Enamel fails to stop corrosion of steel on many parts subject to exposure, while a zinc coating under the enamel, if practical, would be an advantage in checking or preventing the metal corrosion.

WATERBURY

Our last meeting was held on February 10th; there were 30 members present. Mr. George Hogaboom acted as chairman in the absence of President Gray and Vice-President Messick.

A motion was made and carried to make our March 10th meeting an open meeting. Mr. Benoliel will gave a talk on Cleaners.

Professor Luther W. Baleney gave us another fine talk, this time his subject being "Copper." He carried his audience again from "the mine to the plating-tank." He avoided technical terms as far as possible, so that everyone understood and enjoyed his talk. Prof. Baleney spoke for one and one-half hours and answered numerous questions after his talk. A rising vote of thanks was given Prof. Baleney for his splendid talk. He promised to give us a talk on Zinc later in the spring.

The meeting adjourned at 10:15.

ROCHESTER

To say that the smoker of Rochester Branch on February 4th was a success is putting it mild. Things started in a smooth, frictionless manner and ended up with a finish that would cause the great Barnum of circus fame to say, "Ma, Come and Get Your Boy."

Chairman Doering wished Fitch, Jr., on the assembly first. Fitch told the boys a few of the stories that will make 1922 famous. Well, the boys all enjoyed the stories, which seemed to work up quite an appetite for Bernard, Hesselink, Doering, Jordan and Gartland. Groh said he was hungry—he made the sandwiches. Reama thought coffee had better be served, as Hutchings was falling asleep, so Doering got busy with sandwiches, doughnuts, coffee, cigars and cigarettes. Yep, we'll have to pat the Committee on the back, for everything was fine.

Jack Jordan was right there with the moving-picture machine. Jack showed the movies of the convention in Rochester, and it sure looked good to see all those folks that seemed to enjoy themselves so much, once more. The next pictures shown were from the private stock of Mr. Jordan entitled, "Why Men Leave Home." The picture was well-screened. The plot was deep. The Hero played his part in a most able manner.

After the pictures Mr. Bernard suggested more coffee to quiet the nerves of those present. Coffee and doughnuts did the trick.

BOSTON

Boston Branch met February 3rd at the American House, with President Nihan in the chair. After the regular business, the Branch held a discussion of the following solutions: Nickel, Brass, Copper, and Zinc, which was very interesting while it lasted. This was done to show what the members have learned from the lessons given by our Past-President Mackie.

This Branch requests other Branches to submit questions in regard to their respective problems. We will try and help all that ask. This will create new interest in the work of the A. E. S.

PROVIDENCE-ATTLEBORO

The Providence-Attleboro Branch is still on the map. We have had some interesting meetings lately, although our chemistry class is not functioning at present. Owing to the housing problem we find it rather difficult to secure suitable quarters, consequently we are working under a severe handicap.

At our last meeting a very interesting letter was read from one of our members who is now located in Argentine. General business has been quiet he tells us, but being on a sound financial basis, Argentine has every reason to expect a very prosperous future.

Some of our members have certainly put some miles between them and Providence in the last two years. One is located in California, Michigan, Wisconsin and Argentine.

Our next meeting will be held in Providence on March 2, and as a number of the members attended the New York Banquet, we will have some interesting discussions.

We Want to Know:

Question:—What is the best method of preparing die casting metal for nickel-plating? The work is barrel-plating and must have a bright finish.

Question:—What is the best solution for obtaining a clean and bright deposit of Platinum?

MILWAUKEE

The Milwaukee Branch held its regular meeting on February 9th, at Lipp's Hall, 321—3rd St. Frank Marx was elected temporary chairman for the evening, President Armour and Vice-President Guttman being absent. The attendance was unusually large, and the meeting was very interesting.

The Banquet Committee reported that the banquet will be held at the Milwaukee Athletic Club, one of Milwaukee's foremost meeting-places. They also reported that everything was progressing favorably. A very good program has been provided. All A. E. S. members and all electro-platers are cordially invited.

TORONTO

President W. H. Cresswell presided over the meeting, with the usual numbers present. The minutes of the previous meeting were read and accepted. One application was received for associate membership.

Mr. O'Keefe, for the Entertainment Committee, reported progress and everything looked good for a big turnout at the "Social."

Notice was taken of the Bridgeport Branch report where Mr. John Oberender gave an interesting talk on pigment lacquers, with an explanation of methods and mixtures to obtain different finishes. We only wish that the name "Bridgeport" had been "Toronto" for that night, as no doubt it was well worth hearing.

Mr. Vallier read a paper on Gold-Plating of Church Work, which was well received.

TORONTO QUESTION-BOX

QUESTION NO. 1—The question was asked what could be done with nickel anodes that had a black coating on them?

ANSWER NO. 1—Black coating was presumably an oxide or carbon, and if an oxide, to pickle them in dilute sulphuric acid, and if carbon to scour them thoroughly.

QUESTION NO. 2—Does bisulphite of soda used in a brass solution, tend to hold the two metals together?

ANSWER NO. 2—This question was not answered satisfactorily.

QUESTION NO. 3—Is there any advantage in using 100 amperes at 12 volts than at 6 volts?

ANSWER NO. 3—It could not be done under the same conditions.

QUESTION NO. 4—What caused a jellylike substance to appear on nickel-plated die castings? Casting appeared to be absolutely clean before plating?

ANSWER NO. 4—This question was not answered satisfactorily.

Milwaukee Branch Annual Banquet

WILL BE HELD

Saturday, March 18, 7:30 P.M.

at the Milwaukee Athletic Club

Corner Broadway and Mason St.

Tickets, $2.25 per plate.

NEW MEMBERS

New York

C. E. Stiers.....21 E. 18th St., East Orange, N. J.
J. Knapp.....91 Elliot Ave., Maspeth, L. I.

Bridgeport

John O'Neill.....388 Boston Ave., Bridgeport, Conn.

Indianapolis

C. A. Humphries.....1123 N. McCann St., Kokomo, Ind.

APPLICATIONS FOR MEMBERSHIP

Dayton

H. G. Kopf.....c/o Davis Sewing Machine Co., Dayton, Ohio

Indianapolis

William Staff.....608 W. 31st St., Indianapolis, Ind.
William Grund.....1710 N. Washington St., Kokomo, Ind.

Cleveland

Charles J. Carrick.....2036 W. 26th St., Cleveland, Ohio
Frank E. Newcomb.....12310 Forest Grove Ave., Cleveland, Ohio
Seymour C. Kneeland.....3914 Memphis Ave., Cleveland, Ohio
Howard S. Kneeland.....3024 Claybourne Ave., Cleveland, Ohio

Philadelphia

Harry T. Roberts.....1412 N. Vodges St., Philadelphia, Pa.
Harry C. Shelly.....Sellersville, Pa.
Philip A. Lower.....165 Powelton Ave., Woodbyne, N. J.

Toronto

William G. Ryan.....287 Indian Road, Toronto, Ont., Canada

New York

Franklyn J. McStoker.....219 Edison Place, Glendale, L. I.
H. D. Holler.....Polytechnic Institute, Brooklyn, N. Y.
Charles F. Haines.....2813—8th Ave., New York City, N. Y.

Real Man

Men are of two kinds, and he
Was of the kind I'd like to be.
Some preach their virtues, and a few
Express their lives by what they do.
That sort was he. No flowery phrase
No glibly spoken words of praise
Won friends for him. He wasn't cheap
Or shallow, but his course ran deep,
And it was pure. You know the kind.
Not many in a life you finnd
Whose deeds outrun their words so far
That more than what they seem they are.

In life's small things be resolute and great
To keep thy muscles trained know'st thou when fate
Thy measure takes or when she'll say to thee
"I find thee worthy, do this thing for me!"
— Emerson.

BRANCH DIRECTORY

BOSTON

Regular meetings are held second and fourth Thursdays of each month, at 8 p. m., at the American House, Boston. Secretary, A. W. Garrett, 37 Dorset St., Dorchester, Mass.

BRIDGEPORT

Meets third Friday of each month in its laboratory, 260 John St., Bridgeport, Conn. Secretary, L. J. Maraffi, 744 Hancock Ave., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., at the Briggs House, Randolph and Wells Sts. Secretary, F. J. Hanlon, 2855 N. Richmond St., Chicago, Ill.

CINCINNATI

Meets on the first and third Friday of each month, at 1262 State Ave. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets last Saturday of each month at Hotel Winton. Secretary, B. F. McCormick, 2024 Wyandotte Ave., Lakewood, O.

CONNECTICUT VALLEY

Meets on the second Tuesday of each month at 202 Washington St., Hartford, Conn. Secretary, G. E. Vibberts, 31 Crown St., Hartford, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, C. Van Derau, 61 Bish Ave. Dayton, Ohio.

DETROIT

Meets first Friday of each month at the Board of Commerce, Lafayette and Sheldon, at 8 p. m. Secretary, O. H. Phelps, 951 Clay Ave., Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., NE. Secretary, J. Andrew Warner, 738 Fairview Ave., N. E., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1728 Union St., Indianapolis, Ind.

MILWAUKEE

Meets second and fourth Thursdays of each month at the West Side Bank Bldg. Secretary, R. Steuernagel, 1508 Concordia Ave., Milwaukee, Wis.

MONTREAL

Secretary. A. Geroux, 48 Craig West, Montreal, Quebec, Canada.

NEWARK

Meets first, third and fifth Fridays of each month at Forresters' Home, 20 Central Ave., Newark, N. J., at 8 p m Secretary, O. F. Carlson, 225 West Grand St., Rahway, N. J

NEW YORK

Meets second and fourth Fridays of each month at the Broadway Central Hotel Parlors, New York City. Secretary, E. Haas, 504 East 163rd St., New York, N. Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 26 Custom House St., Room 16. Secretary, C. J. Poyton, 269 Ohio Ave., Providence, R. I.

READING

Meets on the second Tuesday of each month. Secretary, William M. Fisher, 654 Gordon St., Reading, Pa.

ROCHESTER

Meets every second and fourth Friday of each month, at Hotel Seneca. Secretary, E. E. Fitch, Jr., 607 Sawyer St., Rochester, N. Y.

SYRACUSE

Secretary, M. J. Crean, 109 Court St., Syracuse N. Y.

ST. LOUIS

Meets first Saturday of each month at Barr Branch Library, corner Jefferson and Lafayette Sts. Secretary, H. H. Williams, 4156 Botanical Ave., St. Louis, Mo.

TOLEDO

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, H. L. Myers, 410 Palmer, Toledo, Ohio.

TORONTO

Meets second Thursday of each month at Occident Hall, Bathurst and Queen Sts. Secretary, C. Kemish, 271 Euston Ave., Toronto, Ontario, Canada.

WATERBURY

Meets every second and fourth Friday of each month. Secretary, Wm. Delage, 47 Prospect St., Waterbury, Conn.